



*LIGO Laboratory / LIGO Scientific Collaboration*

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*LIGO*

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**Advanced LIGO Arm Cavity Baffle ETM  
Assembly Procedure**

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Distribution of this document:  
Advanced LIGO Project

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of the LIGO Laboratory.

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**CHANGE LOG**

<b>Date, version</b>	<b>Summary of Changes</b>
2013-08-07 V1	<ul style="list-style-type: none"> <li>• Created document from E1100867 ACB ITM procedure and updated with ACB ETM information.</li> </ul>
2013-08-07 V2	<ul style="list-style-type: none"> <li>• Added mouse hole covers</li> </ul>
2013-09-11 V3	<ul style="list-style-type: none"> <li>• Changed Upper Hinge Plate and added captive screws</li> <li>• Changed order of assembly of Mouse Hole covers</li> <li>• Corrected call outs of Mouse Hole Covers</li> <li>• Various other corrections to distinguish ETM build</li> </ul>
2013-09-23 V4	<ul style="list-style-type: none"> <li>• Defined serial numbering</li> <li>• Corrected errors</li> <li>• Added visuals</li> </ul>
2013-09-24 V5	<ul style="list-style-type: none"> <li>• Corrected typo</li> </ul>
2014-02-18 V6	<ul style="list-style-type: none"> <li>• Added hardware details such as alternate catalog numbers and product descriptions.</li> <li>• Changed information about some assemblies in regards to sequence and/or info about orientation.</li> <li>• Added descriptions for parts. This aides in assembly process.</li> </ul>

## I. Introduction

This document details the assembly of the AOS SLC Arm Cavity Baffle ETM and its subassemblies:

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### A. Clean room standards

For a clean assembly all LIGO standards should be followed, as presented in the latest version of the **LIGO Contamination Control Plan (E0900047)**. Clean room garb including UHV gloves should be worn when working with parts.

All tools that come in contact with assembly should be cleaned to class B standards.

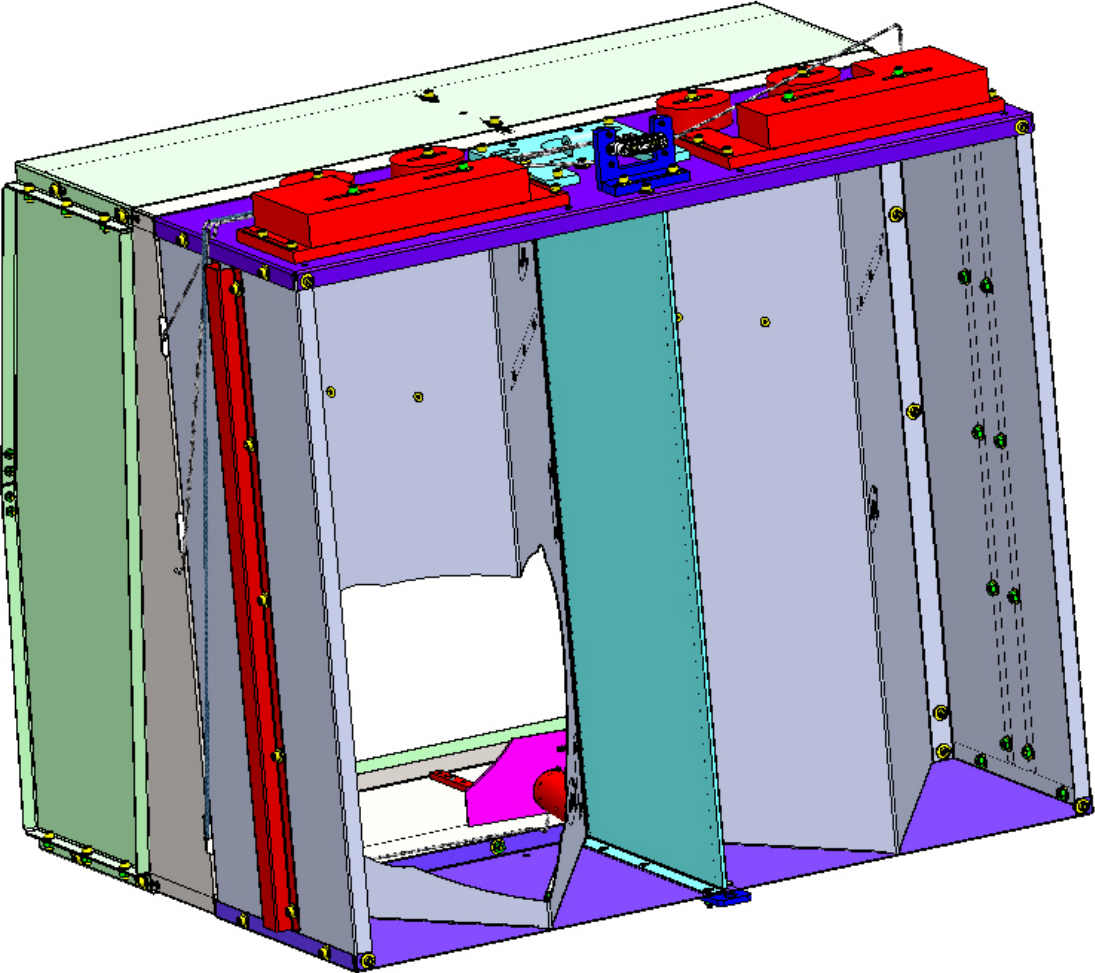
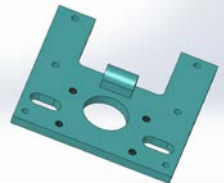
Assembly will be done under a portable clean room. Any time a part of the assembly is not covered by the portable clean room or not being actively worked on it should be covered with appropriate clean covers. (C3 polyester or equivalent).

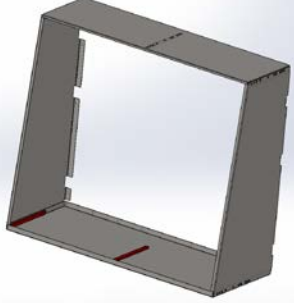
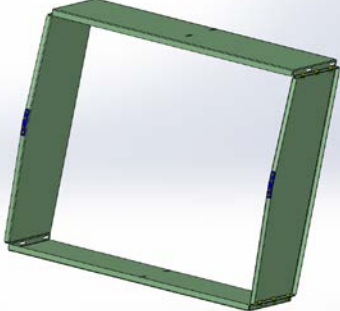
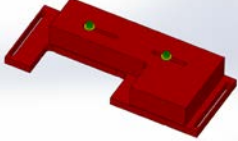
All parts that will be included in the final assembly must be cleaned to LIGO standards, Class A. The list of parts to be Class A-cleaned includes screws, washers, inserts, and assorted other hardware. All tooling and other parts that are not included in the final assembly, but that contact Class A parts during assembly must be cleaned to LIGO standards, Class B.

## B. ETM Arm Cavity Baffle Assembly

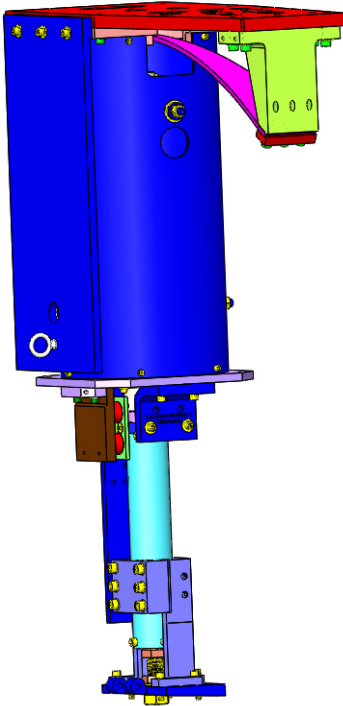
### 1. Overview of the ETM Arm Cavity Baffle Assembly

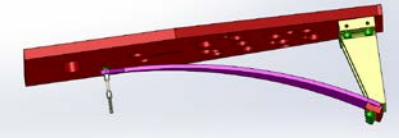
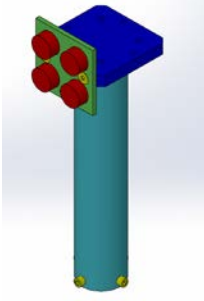


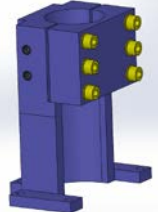
The ETM Arm Cavity Baffle is comprised of the following sub-assemblies and fixtures.

Drawing Number	Description	Image
<p><b>Baffle Box Assembly (D1201036-x and D1200654-y)</b></p> 		
Bottom Hinge Assembly	D1002173	

Shelf Assembly	D1100391	
Extender Shelf Assembly	D1100359	
Counter Weight Assembly (Left and Right)	D1200610 and D1200665	

**Suspension Assembly (D1200655)**



Blade Assembly	D1001005-1	
Lower Tube Assembly	D1001007	
Upper Tube Assembly	D1002582	
Eddy Current Damping 8" Diameter Tube Assembly	D1002564	
Anti-Rotation Assembly	D1201228	

**Notes for all Subassembly:**

1. Assembly requires two people
2. Watch for foil scratched surface

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## II. ARM CAVITY BAFFLE BOX ASSEMBLY

### A. Arm Cavity Baffle Hinge Assembly – D1002173

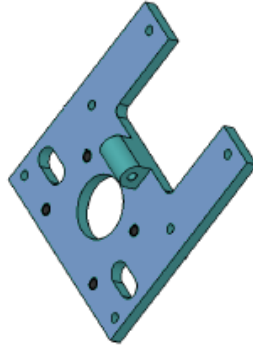


Figure 1: Lower Hinge Assembly

#### 1. List of parts and tools needed:

CLASS A –

D1001622 – 1  
1185-4EN250 – 4 1/4-20 x 1D

SN: \_\_\_\_\_

CLASS B

Tool to insert Heli-Coils

2. Install Heli-Coil inserts into “Arm Cavity Baffle Lower Mounting Hinge” D1001622. Heli-coils are installed from the top side of hinge. Top side shown on picture above.
3. D1002173 serial number – SAME AS D1001622.



## B. Arm Cavity Baffle Shelf Assembly - D1100391

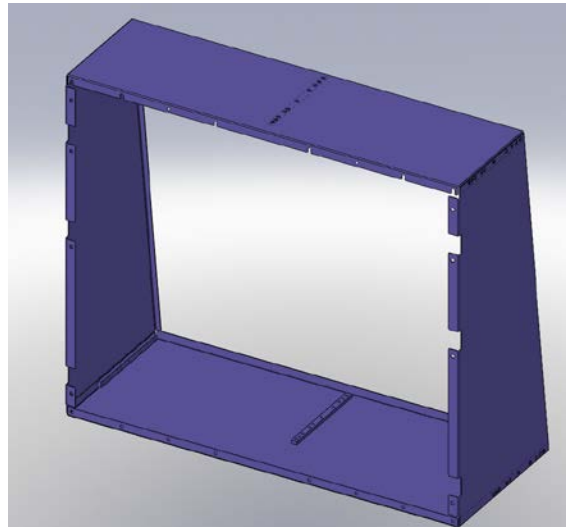


Figure 2: Shelf Assembly

### 1. List of parts and tools needed -

#### CLASS A PARTS

D1001026 – 1 Blade Upper Leaf	SN: _____
D1001027 – 1 Blade Lower Leaf	SN: _____
D1100340 – 1 Blade Right Leaf	SN: _____
D1100327 – 1 Blade Left Leaf	SN: _____
D1100347 – 3 Upper Capture Plate	SN: _____
D1100352 – 3 Lower Capture Plate	SN: _____
FA-605-NA – 18 6-32 x 5/16 Ag FHCS	

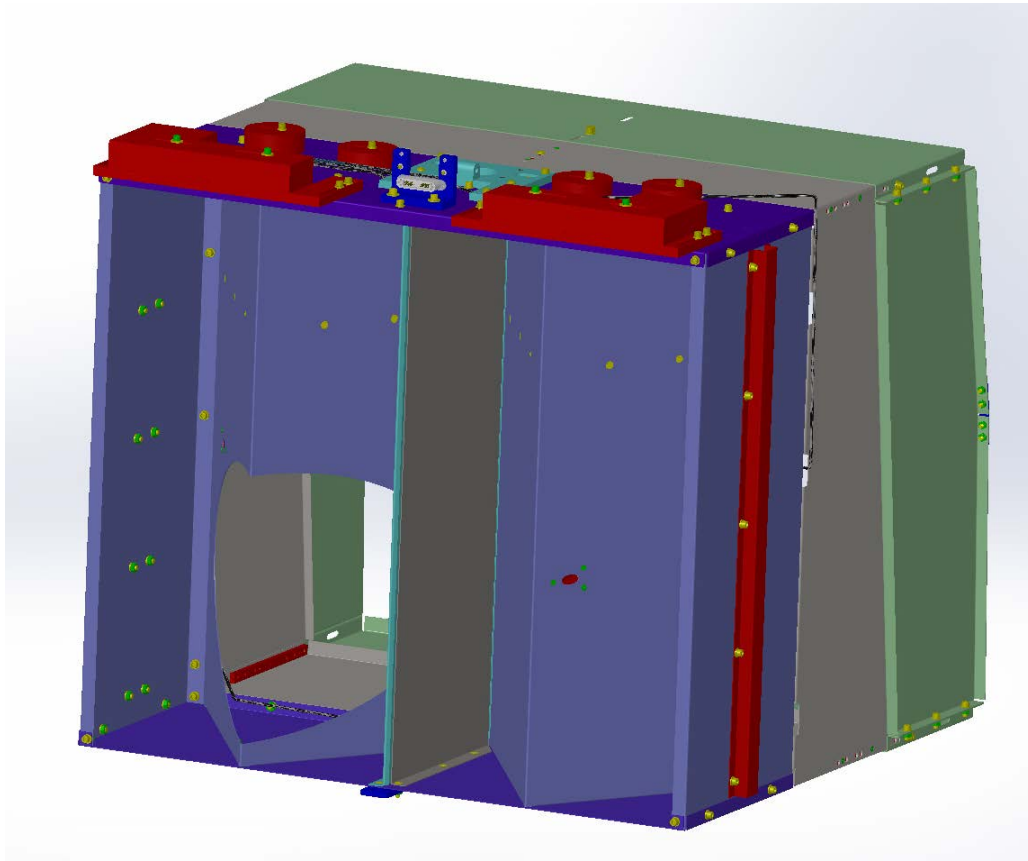
#### CLASS B TOOLS

5/64" Hex Allen Tool

2. Attach “SLC ACB Lo Captured Plate” D1100352 (Short) to center of “SLC Arm Cavity Baffle Lower Leaf” D1001027
  - a. Install hardware 3 places
    - i. FA-605-NA, Flat Head Screw, #6-32 X .312, SSTL - Silver Plated, Qty 3
3. Attach “SLC ACB Right Side Panel” D1100340 to “SLC Arm Cavity Baffle Lower Leaf” D1001027 with “SLC ACB Lo Captured Plate” D1100352 (Short)
  - a. Install hardware 3 places
    - i. FA-605-NA, Flat Head Screw, #6-32 X .312, SSTL - Silver Plated, Qty 3
4. Repeat Step 3 on opposite side with “SLC ACB Left Side Panel” D1100327

5. **Attach “SLC ACB Upper Captured Plate” D1100347 (Long) to center of “SLC Arm Cavity Baffle Upper Leaf” D1001026**
  - a. Install hardware 3 places
    - i. FA-605-NA, Flat Head Screw, #6-32 X .312, SSTL - Silver Plated, Qty 3
6. **Attach “SLC Arm Cavity Baffle Upper Leaf” D1001026 to “SLC ACB Right Side Panel” D1100340 with “SLC ACB Upper Captured Plate” D1100347 (Long)**
  - a. Install hardware 3 places
    - i. FA-605-NA, Flat Head Screw, #6-32 X .312, SSTL - Silver Plated, Qty 3
7. **Repeat Step 6 on opposite side with “SLC ACB Left Side Panel” D1100327**
8. **D1100391 serial number – SAME AS D1001026**

**C. Arm Cavity Baffle Box Assembly -**



**Figure 3: Baffle Box Assembly**

**1. List of assemblies, parts, hardware and tools needed -**

CLASS A ASSEMBLIES

- 1 - D1002173 Hinge Assembly SN: \_\_\_\_\_
- 4 - D1003013 Photo Diode Assembly SN: \_\_\_\_\_
- 1 - D1100391 Box Assembly SN: \_\_\_\_\_
- 1 - D1100359 (will be assembled in this section) SN: SAME AS D1100288
- WF-10, 90945A740 – 16 #10 washer
- 90945A760 – 24 1/4 washer
- 92200A242 – 8 10-24 x 1/2 SHCS
- 92200A537 – 12 1/4-20 x 1/2
- D1100288 – 1 Top Extender SN: \_\_\_\_\_
- D1100353 – 1 Left Extender SN: \_\_\_\_\_
- D1100354 – 1 Right Extender SN: \_\_\_\_\_
- D1100458 – 1 Bottom Extender SN: \_\_\_\_\_
- D1101234 – 2 Stiffener Side Extender SN: \_\_\_\_\_
- N-1024-A – 8 10-24 Ag Hex nut
- N-2520-A – 12 1/4-20 Ag Hex nut

CLASS A PARTS

1 - D1000974 Top Skin	SN: _____
1 - D1000975 Bottom Skin	SN: _____
1 - D1000976 Center Skin	SN: _____
2 - D1001365 Reinforcing Plate (middle)	SN: _____
4 - D1003025 PD Housing	SN: _____
1 - D1003111 PD Cable	SN: _____
1 - D1101427 Brace Lifting Arm	SN: _____
1 - D1101796 Center Mirror Skin	SN: _____
Below are the "W" skins that are ETM/ITM specific.	
1 - D1200322 (for D1201036 only – BSC4/BSC9)	SN: _____
1 - D1200329 (for D1200654 only – BSC5/BSC10)	SN: _____

Balance Weights (Hockey Puck) as described on LIGO-Document E1300070

D1200835 2lb	SN: _____
D1001826 1.5lb	SN: _____
D1200779 1.25lb	SN: _____
D1201230 .5lb	SN: _____

CLASS A HARDWARE

2 – 92196A114	4-40 x 7/8 SHCS
65 – 92200A537	1/4-20 x 1/2 SHCS
4 – 92200A540	10-24 x 1 SHCS
2 – 92200A541	1/4-20 x 7/8 SHCS
18 – 98019A330	#10 Flat washer
156 – 98019A355	(interchangeable with WF-25)
2 – BU-2012-N	1/4-20 x 3/4 BHCS
12 – C-2008-NA	1/4-20 x 1/2 Ag SHCS
73 – C-2012-N	(interchangeable with 92200A537) 1/4-20 x 3/4 SHCS
81 – C-2014-N	(interchangeable with 92200A537) 1/4-20 x 7/8 SHCS
4 – C-2024-N	1/4-20 x 1-1/2 Ag SHCS non vented
18 – FA-2412-N	(must be oxidized) 10-24 x 3/4 FHCS
12 – FA-606-NA	6-32 x 3/8 Ag FHCS
18 – N-1024-A	10-24 Ag Hex nut
75 – N-2520-A	1/4-20 Ag Hex nut
156 – WF-25	(interchangeable with 98019A355)

CLASS B TOOLS

2. Place “SLC Arm Cavity Baffle Skin” D1200322 for X-Arm (or D1200329 for Y-Arm) “W” upside down on build surface.

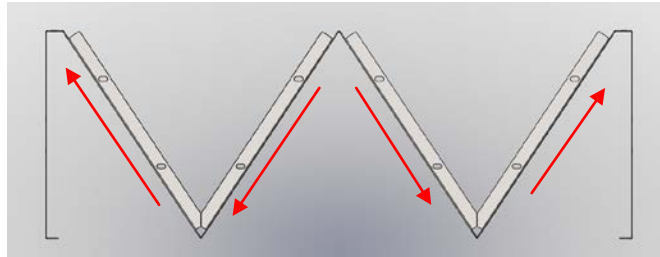


Figure 4: “W” Order of Assembly

NOTE: Order of Assembly: start at the middle “V” and work outwards.

3. Loosely attach “SLC Arm Cavity Baffle Middle Reinforcing Plate” D1001365 to “SLC Arm Cavity Baffle Skin” (“W”). Flat side down for install. The picture below is upside down.
  - a. Install hardware 6 places
  - b. Slotted Holes (screw, SSTL, washer, nut)
    - i. FA-2412-N, Flat Head Screw #10-24 X 3/4”L, SSTL - oxidized, Qty 12
    - ii. 98019A330, Flat #10 Washer, SSTL, Qty 12
    - iii. N-1024-A, Hex Nut #10-24, SSTL - Silver Plated, Qty 12

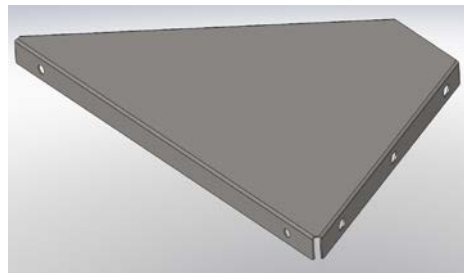


Figure 5: Middle Reinforcing Plate

4. Repeat Step 3 on other side
5. Loosely attach “SLC Arm Cavity Baffle Skin” (“W”) to “SLC Arm Cavity Baffle Bottom Skin” D1000975
  - c. Install hardware 14 places
  - d. Eight Slotted and six Round Holes (screw, washer, SSTL, washer, nut)
    - i. 92200A537, Socket Head Cap Screw 1/4”-20 X 1/2”L, SSTL Qty 14
    - ii. 98019A355, Flat 1/4” Washer, .63” OD, SSTL Qty 28
    - iii. N-2520-A, Hex Nut 1/4”-20, SSTL - Silver Plated, Qty 14

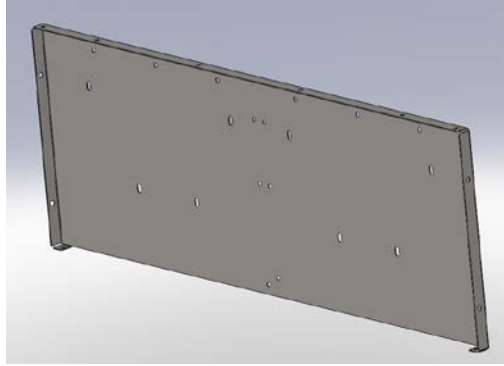


Figure 6: Bottom Skin

6. Attach four “Photo Detectors Housings” D1003025 to “SLC Arm Cavity Baffle Skin” (“W”)
  - a. Install hardware 12 places
    - i. FA-606-NA, Flat Head Screw #6-32 X 3/8”L, SSTL - Silver Plated, Qty 12

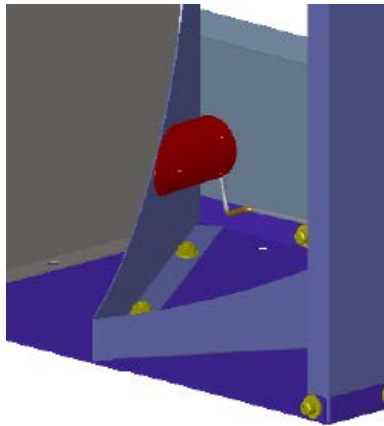


Figure 7: PD Housing mating

7. Lay Assembly down
8. Attach “SLC Arm Cavity Baffle Center Skin” D1000976 and “Arm Cavity Baffle Center, Mirror Skin” D1101796 to “SLC Arm Cavity Baffle Bottom Skin” D1000975 and “Brace, Lifting, Arm Cavity Baffle” D1101427. Refer to **D1200656 for X-Arm or D1200653 for Y-Arm** assembly drawing for clarification.
  - a. Install hardware 6 places
  - b. Round Holes (screw, SSTL, Brace, washer, nut)
    - i. FA-2412-NA, Flat Head Screw #10-24 X 3/4”L, SSTL - oxidized, Qty 6
    - ii. 98019A330, Flat #10 Washer, SSTL, Qty 6
    - iii. N-1024-A, Hex Nut #10-24, SSTL - Silver Plated, Qty 6

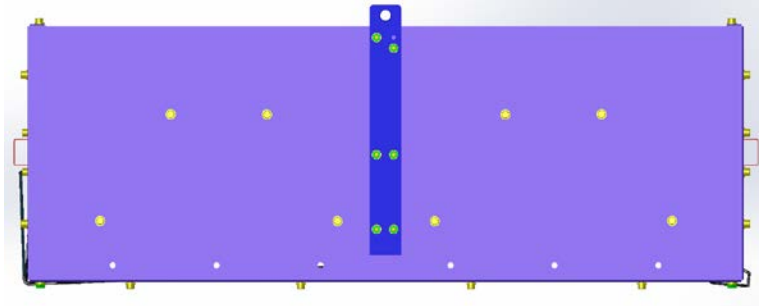


Figure 8: Lifting Brace attachment

9. Place assembly upright.

10. Loosely attach “SLC Arm Cavity Baffle Top Skin” D1000974 to “SLC Arm Cavity Baffle Skin” (“W”), “SLC Arm Cavity Baffle Center Skin” D1000976, and “Arm Cavity Baffle Center, Mirror Skin” D1101796

- e. Install hardware 19 places
- f. Eight Slotted and eleven Round Holes (screw, washer, SSTL, washer, nut)
  - i. 92200A537, Socket Head Cap Screw 1/4”-20 X 1/2”L, SSTL Qty 19
  - ii. 98019A355, Flat 1/4” Washer, .63” OD, SSTL Qty 38
  - iii. N-2520-A, Hex Nut 1/4”-20, SSTL - Silver Plated, Qty 19

11. Tighten all screws.

12. Attach completed “ACB Shelf Assembly” D1100391 to “Arm Cavity Baffle Box Assembly” and tighten all locations.

- a. Install hardware 20 places
- b. Round Holes (screw, washer, SSTL (x2), washer, nut)
  - i. 92200A537, Socket Head Cap Screw 1/4”-20 X 1/2”L, SSTL Qty 20 – longer screws are available, if needed.
  - ii. 98019A355, Flat 1/4” Washer, .63” OD, SSTL Qty 40
  - iii. N-2520-A, Hex Nut 1/4”-20, SSTL - Silver Plated, Qty 20

13. Lay Baffle Box assembly flat with front facing down.

\*\*\*\* Assembly and attachment of D1100359 – Adjustable Extender Shelf Assembly \*\*\*\*

14. Loosely attach “SLC ACB Bottom Extender” D1100458 to bottom of “ACB Shelf Assembly” D1100391 into “SLC ACB Lo Captured Plate” D1100352

- g. Install center hardware 2 places – Do not tighten
- h. Slotted Holes (screw, washer, SSTL (x2), capture plate)
  - i. C-2008-NA, Socket Head Cap Screw, 1/4-20 X 1/2”L, SSTL Silver Plated Qty 2
  - ii. 98019A355, Flat 1/4” Washer .63” OD, SSTL Qty 2
- i. Install side hardware 4 places – Do not tighten
- j. Slotted Holes (screw, washer, SSTL (x2), capture plate)

- i. C-2008-NA, Socket Head Cap Screw, ¼-20 X 1/2”L, SSTL Silver Plated Qty 4
- ii. 98019A355, Flat ¼” Washer .63” OD, SSTL Qty 4

**15. Loosely attach “SLC ACB Top Extender” D1100288 to top of “ACB Shelf Assembly” D1100391 into “SLC ACB Upper Captured Plate” D1100347**

- k. Install center hardware 2 places – Do not tighten
- l. Slotted Holes (screw, washer, SSTL (x2), capture plate)
  - i. C-2008-NA, Socket Head Cap Screw, ¼-20 X 1/2”L, SSTL Silver Plated Qty 2
  - ii. 98019A355, Flat ¼” Washer .63” OD, SSTL Qty 2
- m. Install side hardware 4 places – Do not tighten
- n. Slotted Holes (screw, washer, SSTL (x2), capture plate)
  - i. C-2008-NA, Socket Head Cap Screw, ¼-20 X 1/2”L, SSTL Silver Plated Qty 4
  - ii. 98019A355, Flat ¼” Washer .63” OD, SSTL Qty 4

**16. Loosely attach “SLC ACB Left Side Extender” D1100353 to “SLC ACB Bottom Extender” D1100458 and “SLC ACB Top Extender” D1100288**

- o. Install hardware 6 places – Do not tighten
- p. Round Holes (screw, washer, SSTL (x2), washer, nut)
  - i. 92200A537, Socket Head Cap Screw 1/4”-20 X 1/2”L, SSTL Qty 6
  - ii. 98019A355, Flat ¼” Washer, .63” OD, SSTL Qty 12
  - iii. N-2520-A, Hex Nut ¼”-20, SSTL - Silver Plated, Qty 6

**17. Repeat Step 16 on opposite side with “SLC ACB Right Side Extender” D1100354**

**18. Attach “ACB Stiffener Side Extender” D1101234 to “SLC ACB Left Side Extender” D1100353**

- q. Install hardware 4 places
- r. Round Holes (screw, washer, Aluminum, SSTL, washer, nut)
  - i. 92200A242, Socket Head Cap Screw #10-24 X 1/2”L, SSTL Qty 4
  - ii. 98019A330, Flat #10 Washer, SSTL Qty 8
  - iii. N-1024-A, Hex Nut #10-24, SSTL - Silver Plated, Qty 4

**19. Repeat Step 18 on opposite side with “SLC ACB Right Side Extender” D1100354**

**20. Set alignment of Extender parts and placement as defined in assembly drawing D1200656 for X-Arm or D1200653 for Y-Arm on Sheet 4. Tighten screws enough to hold measurement.**

**21. Tighten all screws. Verify placement measurements are accurate. Loosen and re-tighten, if needed, to meet requirement.**

**22. Attach “ACB Hinge Assembly” D1002173 to top of “ACB Baffle Box”**

- s. Install hardware 2 places
- t. Round Holes (screw, Hinge, SSTL, washer, nut)
  - i. BU-2012-N, Button Head Screw, ¼-20 X 3/4”L, SSTL Qty 2
  - ii. 98019A355, Flat ¼” Washer, SSTL Qty 2



- iii. N-2520-A, Hex Nut ¼”-20, SSTL Silver Plated, Qty 2
- u. Install hardware 4 places
- v. Round Holes (screw, Hinge, SSTL, washer, nut)
  - i. 92200A540, Socket Head Cap Screw, ¼-20 X 3/4”L, SSTL Qty 4
  - ii. 98019A355, Flat ¼” Washer, SSTL Qty 4
  - iii. N-2520-A, Hex Nut ¼”-20, SSTL Silver Plated, Qty 4

**23. Attach “SLC ACB Balancing Weight” to top of “ACB Baffle Box” as defined from selection of Suspension Assembly Spring Blade serial number. See Document E1300070 for balance weights.**

- a. Install hardware 4 places
- b. **Round Holes (screw, washer, Balance Weight, SSTL, washer, nut)**
  - i. C-2024-N, Socket Head Cap Screw, ¼-20 X 1.5”L, SSTL, Qty 4
  - ii. 98019A355, Flat ¼” Washer, SSTL Qty 8
  - iii. N-2520-A, Hex Nut ¼”-20, SSTL Silver Plated, Qty 4

## D. Photodetector Assembly (D1003013) & Lower Cable (D1003111)

### 1. List of parts, subassemblies and tools needed –

#### CLASS A PARTS

1 - D1001346-1 HAM Table bracket (short)	SN: _____
2 - D1001363 Side Reinforcing hat section	SN: _____
4 - D1003013 (will be assembled in this section)	Same SN as PD Housing (D1003025)
4 - D1003024 Front Peek connector	SN: _____
4 - D1101713 aka YA-444-AH Photo Diodes	SN: _____
12 - FA-410-A          4-40 x 5/8 Ag FHCS	
1 - D1201160 Upper Right Mouse Hole Cover	SN: _____
1 - D1201163 Upper Left Mouse Hole Cover	SN: _____
1 - D1201164 Lower Right Mouse Hole Cover	SN: _____
1 - D1201165 Lower Left Mouse Hole Cover	SN: _____

#### CLASS A HARDWARE

8 - 98019A330	#10 Flat washer
2 - 92196A114	4-40 x 7/8 SHCS
20 - 92200A537	1/4-20 x 1/2 SHCS
2 - 92200A541	1/4-20 x 7/8 SHCS
44 - 98019A355	1/4 washer
F442-003C	– as required (cable clips)
F402-003C	– as required
8 - FA-2412-N (must be oxidized)	10-24 x 3/4 FHCS
8 - N-1024-A	10-24 Ag Hex nut
22 - N-2520-A	1/4-20 Ag Hex nut
44 - WF-25 (interchangeable with 98019A355)	

### 2. Attach “aLIGO Cable Bracket, Ham Table Assembly” D1001346-1 to top of “ACB Baffle Box”

- a. Install hardware 2 places
- b. **Round Holes (screw, washer, Bracket, SSTL, washer, nut)**
  - i. 92200A541, Socket Head Cap Screw, 1/4-20 X .88”L, SSTL, Qty 2
  - ii. 98019A355, Flat 1/4” Washer, SSTL Qty 4
  - iii. N-2520-A, Hex Nut 1/4”-20, SSTL Silver Plated, Qty 2

### 3. Attach the two “SLC Photodetector Cable Lower Assembly” D1003111 to “aLIGO Cable Bracket, Ham Table Assembly” D1001346-1

- a. Install hardware 2 places
- b. **Round Holes (screw)**
  - i. 92196A114, 4-40 X 7/8”L, SSTL Qty 2

### 4. Route cables through slots in side panels of “ACB Baffle Box”, 4 places.

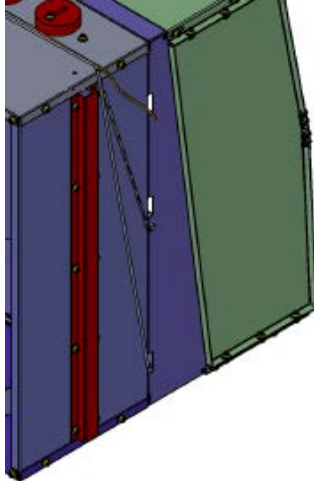


Figure 9: Lower Cable Routing

5. Place “PD PCB Support” D1003028 on top of “Arm Cavity Baffle ALS PD PCB” D1003239 at the ends of the “SLC Photodetector Cable Lower Assembly” D1003111, 4 places. Carefully insert “Photodiode, ACB” D1101713 into sockets in “Arm Cavity Baffle ALS PD PCB” D1003239, 4 places. Watch for bent pins and correct orientation.

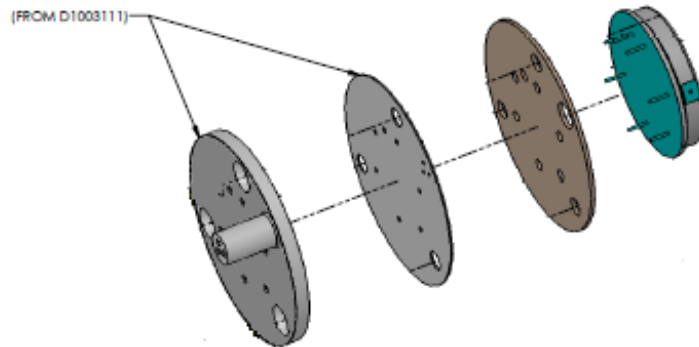


Figure 10: PD Assembly

6. Insert “PD Front Peek Insulator” D1003028 into “Photo Detectors Housings” D1003025 aligning holes for attachment, 4 places.

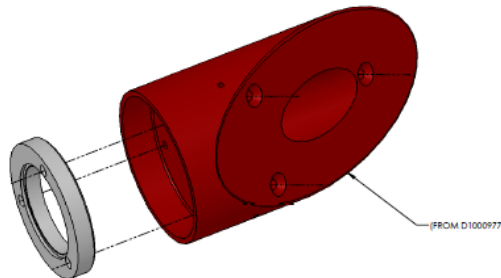


Figure 11: Peek Insulator installation

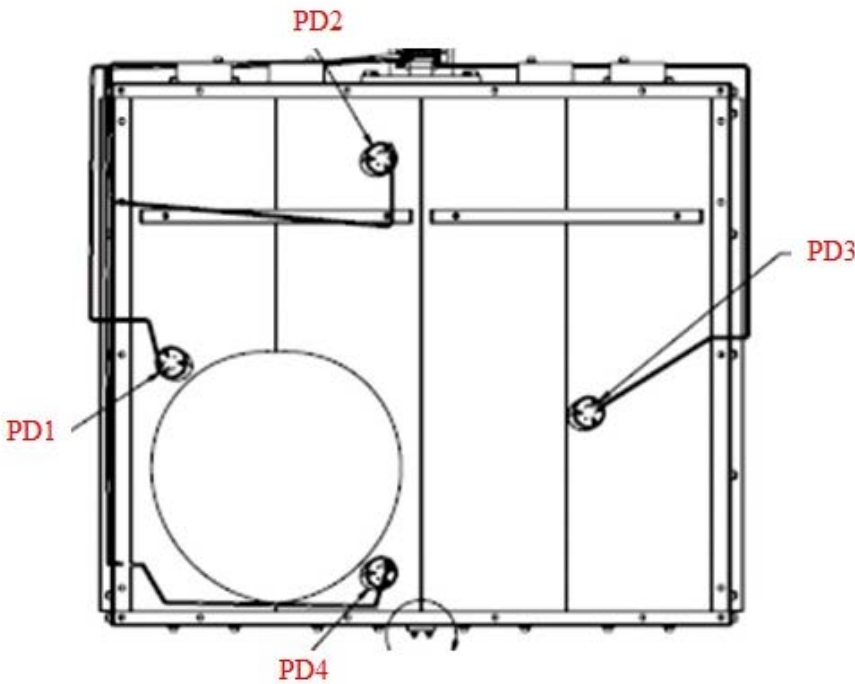


Figure 12: PD locations for D1201036 (BSC4/BSC9)

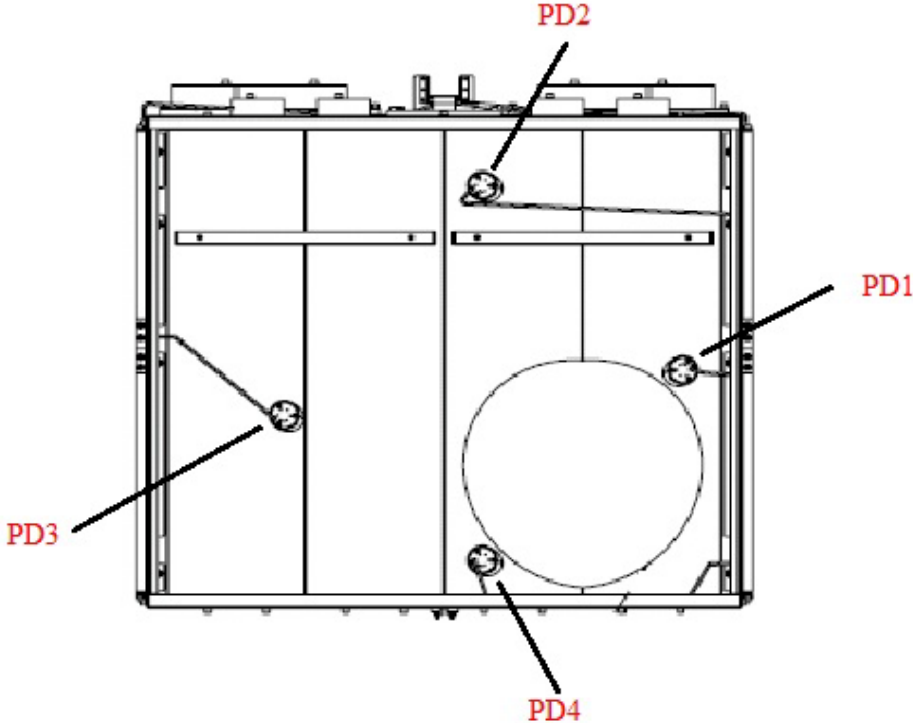


Figure 13: PD locations for D1200653 (BSC5/BSC10)

7. **Attach ends of cable to “Photo Detectors Housings” D1003025 at locations marked on “PD Back Peek” D1003014, 4 places.**
  - a. Install hardware 12 places
  - b. **Round Holes (screw, peek, PCB, kapton, PD, peek, SSTL)**
    - i. FA-410-A, 4-40 X 5/8”L, vented, silver plated SSTL Qty 12
8. **Attach Mouse Hole Covers as shown in D1201036/D1200654.**
  - a. Install hardware 2 places per cover.
  - b. Install cover on back side of baffle (FHCS, W, Cover, washer, nut).
    - i. FA-2412-NA, Flat Head Screw #10-24 X 3/4”L, SSTL - oxidized, Qty 2
    - ii. 98019A330, Flat #10 Washer, SSTL, Qty 2
    - iii. N-1024-A, Hex Nut #10-24, SSTL - Silver Plated, Qty 2

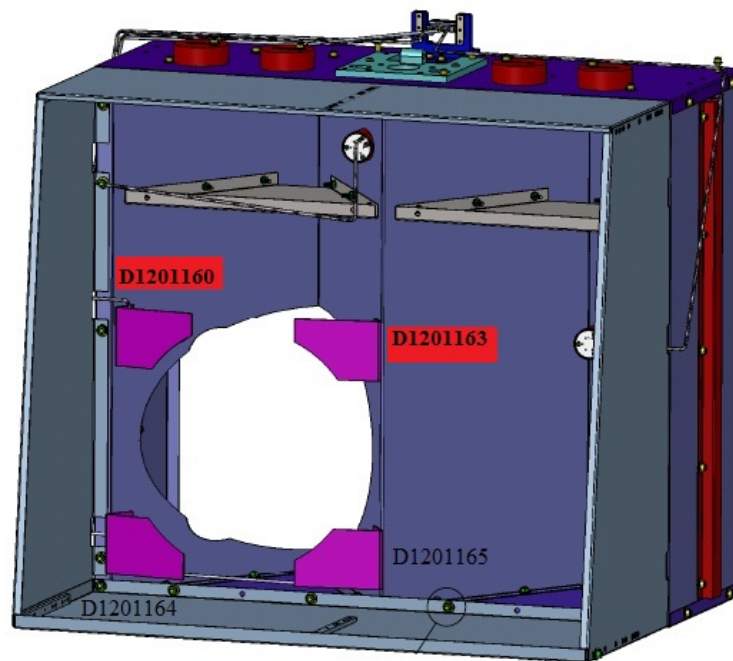
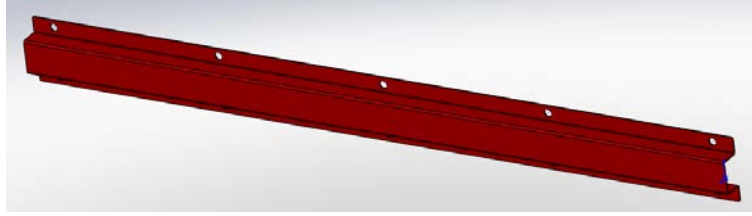


Figure 14: Mouse Hole Cover placement (BSC4/BSC9)

9. **Attach “ACB Side Reinforcing Hat Section” D1001363 to each side of the “SLC Arm Cavity Baffle Skin” (“W”) while routing cables using Clips F442-003C and F402-003C, as needed.**
  - w. Install hardware **10** places each side
  - x. Round Holes (screw, washer, SSTL (x2), washer, nut)
    - i. 92200A537, Socket Head Cap Screw 1/4”-20 X 1/2”L, SSTL Qty 20
    - ii. 98019A355, Flat 1/4” Washer, .63” OD, SSTL Qty 40
    - iii. N-2520-A, Hex Nut 1/4”-20, SSTL - Silver Plated, Qty 20



**Figure 15: Hat Section**

**10. Route cables securely to “ACB Baffle Box” using cable ties F442-003C and F402-003C, as needed.**

## E. Counter Weight Assemblies

### 1. List of parts and tools needed –

#### CLASS A PARTS

2 - D1200644 Counter Weight Slider (mass)  
2 - D1200686 Counter Weight Base

SN: \_\_\_\_\_

SN: \_\_\_\_\_

#### CLASS A HARDWARE

4 - C-2028-NA       $\frac{1}{4}$ -20 x 1-3/4 Ag SHCS  
4 - WF-25           $\frac{1}{4}$  washer  
8 - C-2014-N       $\frac{1}{4}$ -20 x 7/8 SHCS  
16 - 98019A355     $\frac{1}{4}$ -20 Ag Hex nut  
8 - N-2520-A

### 2. Attach right side “Counter Weight Slider” D1200644 to “Counter Weight Base” D1200686 as shown in drawing D1200665.

- a. Install hardware 2 places
- b. **Slotted Holes (screw, washer, Slider, Base)**
  - i. C-2028-NA, Socket Head Cap Screw,  $\frac{1}{4}$ -20 X 1.75”L, Ag-plated SSTL, Qty 2
  - ii. WF-25, Flat  $\frac{1}{4}$ ” Washer, SSTL Qty 2

### 3. Attach left side “Counter Weight Slider” D1200644 to “Counter Weight Base” D1200686 as shown in drawing D1200610.

- a. Install hardware 2 places
- b. **Slotted Holes (screw, washer, Slider, Base)**
  - i. C-2028-NA, Socket Head Cap Screw,  $\frac{1}{4}$ -20 X 1.75”L, Ag-plated SSTL, Qty 2
  - ii. WF-25, Flat  $\frac{1}{4}$ ” Washer, SSTL Qty 2

### 4. Attach “Counter Weight Assembly – Right Side” D1200665 to top of “ACB Box Assembly” as shown in drawing **D1200656 for X-Arm or D1200653 for Y-Arm on Sheet 4.**

- a. Install hardware 4 places
- b. **Round Holes (screw, washer, Counter Weight Assembly, SSTL, washer, nut)**
  - i. C-2014-N, Socket Head Cap Screw  $\frac{1}{4}$ ”-20 X 7/8”L, SSTL Qty 4
  - ii. 98019A355, Flat  $\frac{1}{4}$ ” Washer, .63” OD, SSTL Qty 8
  - iii. N-2520-A, Hex Nut  $\frac{1}{4}$ ”-20, SSTL - Silver Plated, Qty 4

### 5. Attach “Counter Weight Assembly – Left Side” D1200610 to top of “ACB Box Assembly” as shown in drawing **D1200656 for X-Arm or D1200653 for Y-Arm on Sheet 4.**

- a. Install hardware 4 places
- b. **Round Holes (screw, washer, Counter Weight Assembly, SSTL, washer, nut)**
  - i. C-2014-N, Socket Head Cap Screw  $\frac{1}{4}$ ”-20 X 7/8”L, SSTL Qty 4
  - ii. 98019A355, Flat  $\frac{1}{4}$ ” Washer, .63” OD, SSTL Qty 8
  - iii. N-2520-A, Hex Nut  $\frac{1}{4}$ ”-20, SSTL - Silver Plated, Qty 4

**F. Baffle Box Final Assembly**

- 1. Test cables per Procedure T1100637.                      PASS                      FAIL (circle one)**

Comments:

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- 2. Torque all screws, as required.**

- 3. Record serial number of applicable Box Assembly:**

D1201036 (BSC4/BSC9)

SN: SAME AS D1000974

D1200654 (BSC5/BSC10)

SN: SAME AS D1000974

- 4. Weigh assembly and record: \_\_\_\_\_ lbs. (kg/grams)**



### III. ARM CAVITY Baffle SUSPENSION ASSEMBLY

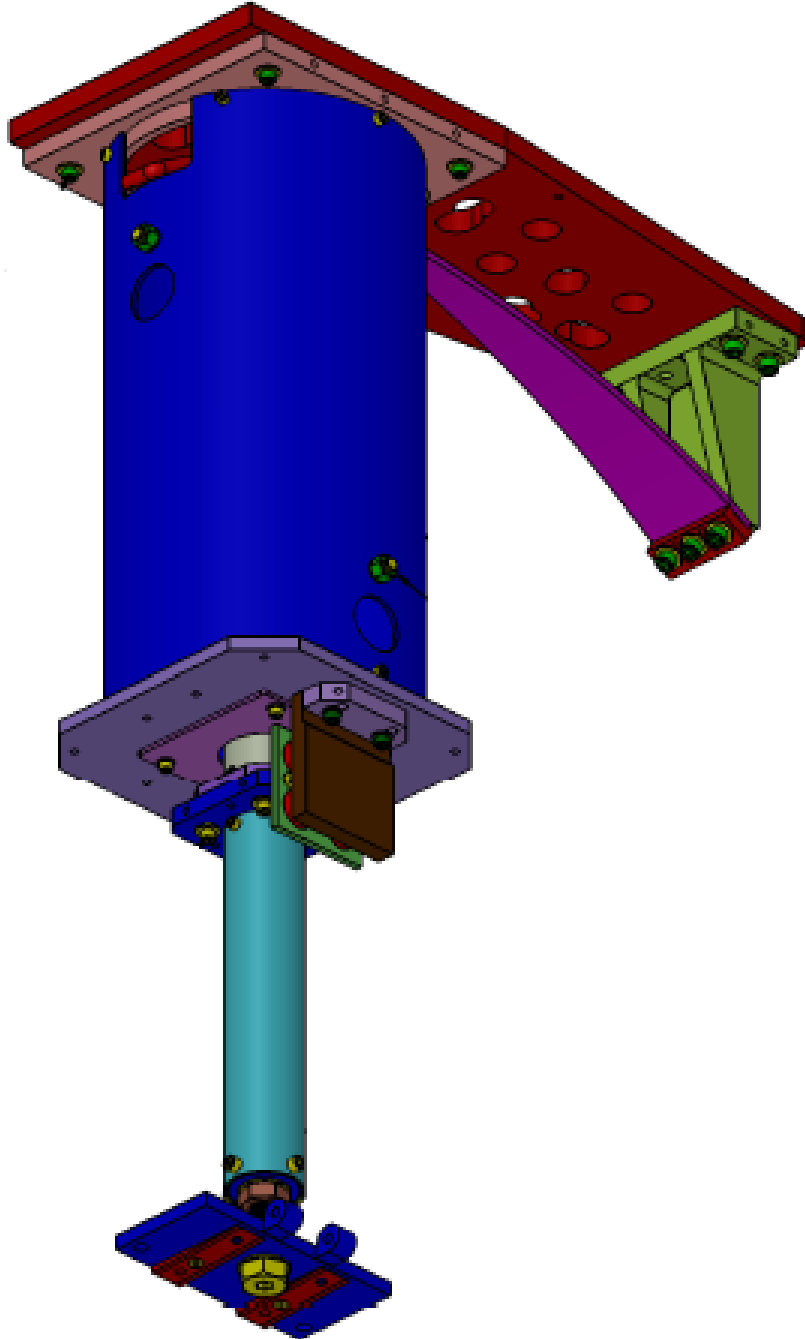


Figure 16: Suspension Assembly

## A. D1002582 - SLC BAFFLE TUBE UP ASSEMBLY

### LIGO Parts:

- |  |           |
|--|-----------|
| (1) D1002612 - SLC UPPER TUBE              | SN: _____ |
| (1) D1002610 - SLC TUBE UP CONNECTOR PLATE | SN: _____ |
| (1) D1002581 - SLC SUSPENSION ROD SUPPORT  | SN: _____ |

### Hardware:

- (4) 92200A537 (1/4-20 x 1/2 SHCS)
- (4) 92200A242 (10-24 x 1/2 SHCS)

### Tools:

- 3/16" Hex L-Key tool (1/4-20 SHCS)
- 5/32" Hex L-Key tool (10-24 SHCS)

5. **Insert D1002581 – SLC SUSPENSION ROD SUPPORT into D1002612 – SLC UPPER TUBE on end closest to view holes, see Figure 16. Align with fastener holes. Parts may not slide together with ease.**
  - a. Install hardware 4 places
    - i. 92200A537 (1/4-20 x 1/2 SHCS)
  
6. **Insert D1002610 – SLC TUBE UP CONNECTOR PLATE into D1002612 – SLC UPPER TUBE on end furthest from view holes, see Figure 16: Baffle Tube Up Assembly. Align with fastener holes.**
  - a. Install hardware 4 places
    - i. 92200A242 (10-24 x 1/2 SHCS)
  
7. **D1002582 serial number – Same as D1002612.**

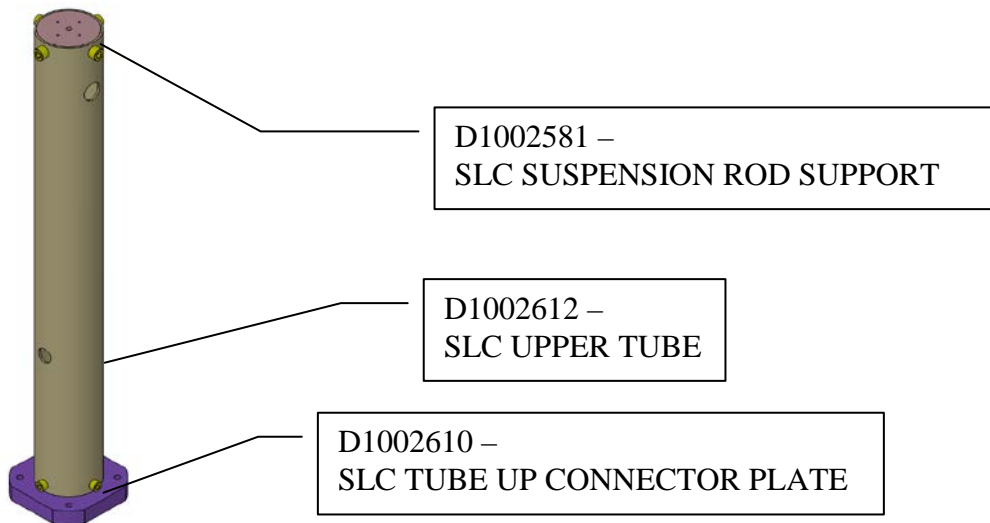


Figure 17: Baffle Tube Up Assembly

## B. D1001007 - SLC ACB LO TUBE ASSEMBLY

**LIGO Parts:**

- (1) D1001009 - ARM CAVITY BAFFLE LO TUBE
- (1) D1000684 - SLC TUBE LOWER MOUNTING PLATE
- (1) D1002618 - SLC TUBE LOWER CONNECTOR PLATE
- (1) D1000930 - SLC MAGNET HOLDER STEEL PLATE

SN: \_\_\_\_\_  
 SN: \_\_\_\_\_  
 SN: \_\_\_\_\_  
 SN: \_\_\_\_\_

**Other Parts:**

- (4) N35P1000500HT - BUNTING MAGNETIC-NEODYMIUM (1.00D x .50H)

**Hardware:**

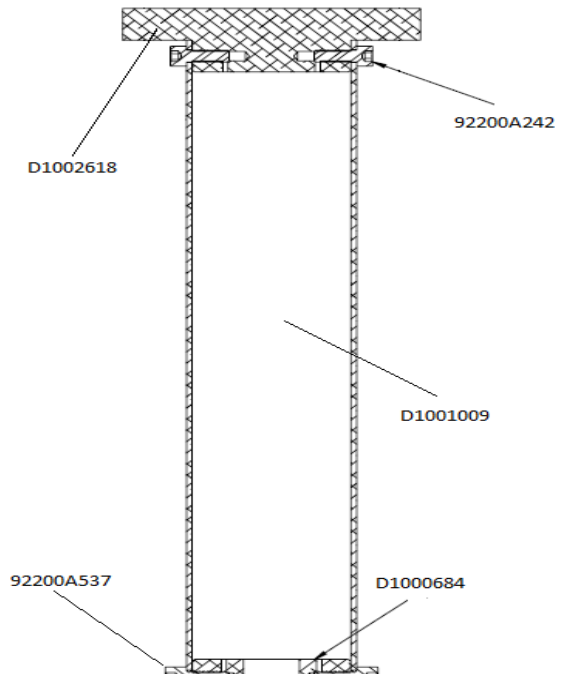
- (4) 92200A537 (1/4-20 x 1/2 SHCS)
- (2) 94518A510 (1/4-20 x 1/2 FHCS)
- (4) 92200A242 (10-24 x 1/2 SHCS)

**Tooling/Fixtures:**

- D1201014 – Magnet Spacer Tool
- Small test magnet for Section II.B.4
- D1200635 – Magnet Placement Tool

**Tools:**

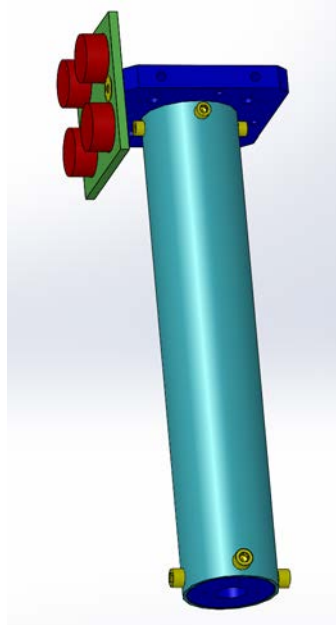
- 3/16” Hex L-Key tool (1/4-20 SHCS)
- 5/32” Hex L-Key tool (10-24 SHCS)
- Philips Screwdriver



**Figure 18: Lo Tube Assembly**

1. Insert D1000684 - SLC TUBE LOWER MOUNTING PLATE into D1001009 - ARM CAVITY BAFFLE LO TUBE, see Figure 17. Align with *larger* fastener holes.
  - a. Install hardware 4 places
    - i. 92200A537 (1/4-20 x 1/2 SHCS)
2. Insert D1002618 - SLC TUBE LOWER CONNECTOR PLATE into D1001009 - ARM CAVITY BAFFLE LO TUBE, see Figure 17. Align with *smaller* fastener holes.
  - a. Install hardware 4 places
    - i. 92200A242 (10-24 x 1/2 SHCS)

3. Attach D1000930 - SLC MAGNET HOLDER STEEL PLATE to D1002618 - SLC TUBE LOWER CONNECTOR PLATE, see Figure 18.
  - a. Install hardware 2 places
    - i. 94518A510 (1/4-20 x 1/2 FHCS)
4. Attach N35P1000500HT - BUNTING MAGNETIC-NEODYMIUM Magnets in 4 places.
  - a. Use Teflon tool D1200635 to install magnets.
  - b. Alternate polarity of magnets (need small test magnet to test polarity)
  - c. If magnets are wrong, use tool to extract the wrong magnets; then, reverse the magnets as required.
5. D1001007 serial number – Same as D1001009.



**Figure 19: Lo Tube magnet placement**

### C. D1002564 - SLC EDDY CURRENT DAMPING 8 DIA TUBE ASSEMBLY

LIGO Parts:

- |  |           |
|--|-----------|
| (1) D1002560 - SLC DAMPING TUBE TOP PLATE    | SN: _____ |
| (1) D1002561 - SLC DAMPING 8 INCHES DIA TUBE | SN: _____ |
| (1) D1002617 - SLC DAMPING TUBE LOWER PLATE  | SN: _____ |
| (1) D1000929 - SLC COPPER SUPPORT PLATE      | SN: _____ |
| (1) D1000909 - SLC COPPER PLATE              | SN: _____ |

Hardware:

- (12) 92200A242 (10-24 x 1/2 SHCS)
- (2) 90233A815 (10-24 x 1/2 FHCS TITANIUM)
- (2) 93286A044 (#25 FLAT WASHER ALUMINUM)
- (2) 95435A755 (1/4-20 x 3/4 SHCS TITANIUM)

Tools:

- 3/16" Hex L-Key tool (1/4-20 SHCS)
- 5/32" Hex L-Key tool (10-24 SHCS)
- Phillips screw driver

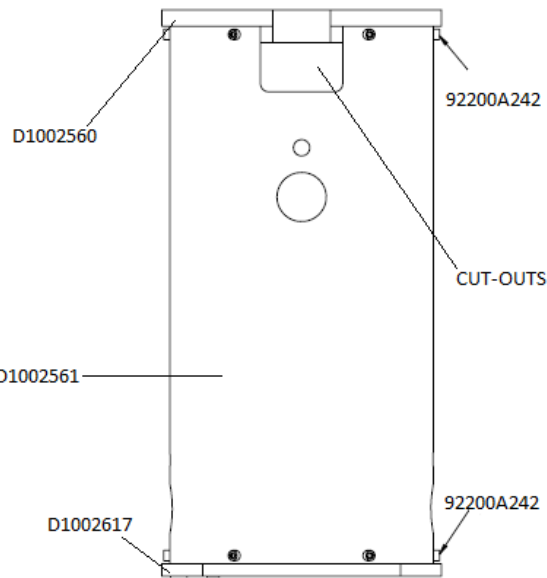
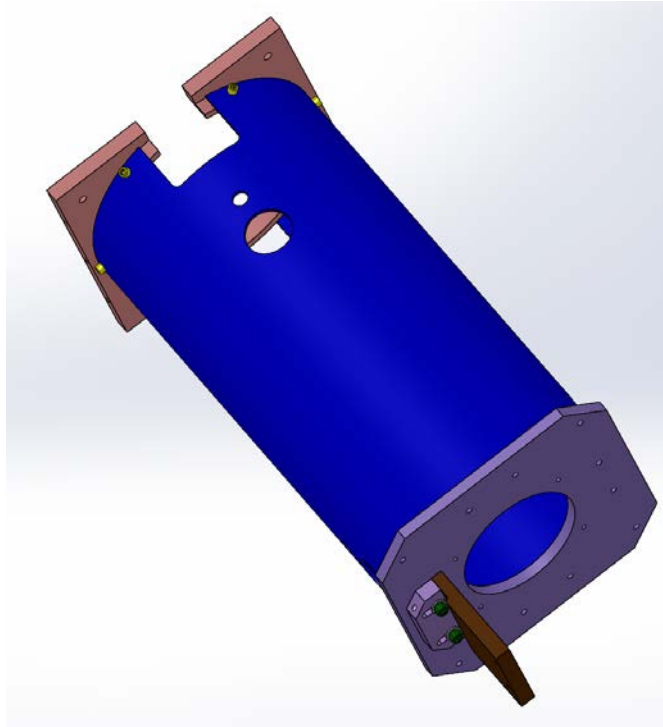


Figure 20: Eddy Current Damping Tube Assembly

1. Insert D1002560 - SLC DAMPING TUBE TOP PLATE into D1002561 - SLC DAMPING 8 INCHES DIA TUBE, see Figure 19. Align with fastener holes and cut-outs.
  - a. Install hardware 6 places
    - i. 92200A242 (10-24 x 1/2 SHCS)

2. Insert D1002617 - SLC DAMPING TUBE LOWER PLATE into D1002561 - SLC DAMPING 8 INCHES DIA TUBE, see Figure 19. Top and lower plate edges should be aligned with fastener holes.
  - a. Install hardware 6 places
    - i. 92200A242 (10-24 x 1/2 SHCS)
3. Attach D1000909 – SLC COPPER PLATE to D1000929 – SLC COPPER SUPPORT PLATE.
  - a. Install hardware 2 places
    - i. 90233A815 (10-24 x 1/2 FHSC)
4. Loosely attach D1000929 - SLC COPPER SUPPORT PLATE to D1002617 - SLC DAMPING TUBE LOWER PLATE in orientation shown in Figure 20. Fasteners will be tightened in Section II.E.12.
  - a. Install hardware 2 places
    - i. 93286A044 (#25 FLAT WASHERS ALUM)
    - ii. 95435A755 (1/4-20 x 3/4 SHCS TITANIUM)
5. D1002564 serial number - Same as D1002561.



**Figure 21: Copper Plate location**

## D. D1001005 - ARM CAVITY BAFFLE BLADE ASSEMBLY

Record assembly TYPE: -1; Record assembly serial number – Same as D1002608

### LIGO Parts:

- |  |           |
|--|-----------|
| (1) D1002609 - SLC BLADE MOUNTING BRACKET            | SN: _____ |
| (1) D1001138 - SLC ACB INTERFACE MOUNTING PLATE, ETM | SN: _____ |
| (1) D1002608 - SLC ACB SUSPENSION BLADE              | SN: _____ |
| (1) D1002844 - SLC ACB BLADE CLAMP                   | SN: _____ |
| (1) D1200781 - SLC ACB SUSPENSION ROD                | SN: _____ |

### Hardware:

- (7) C-1820-NA (5/16-18 x 1 1/4 SHCS Ag)
- (7) 98019A385 (5/16 FLAT WASHER)

### Tooling/Fixtures:

- (1) D1101099 - ARM CAVITY BAFFLE BEND FIXTURE
- (1) D1101298 - BLADE SPRING BENDING HOOK ASSEMBLY
- (1) D1101184 - SLC BEND FIXTURE PLATE
- (4) D1001700 - SLC INTERFACE MOUNTING CLAMP
- VARIOUS 11b-20lb WEIGHTS

### Tooling/Fixture Hardware:

- (4) C-2008-NA (1/4-20 x 1/2 SHCS Ag)
- (4) 98019A355 (1/4 FLAT WASHER)
- (2) C-2016-NA (1/4-20 x 1 SHCS Ag)
- (2) C-2012-NA (1/4-20 x 3/4 SHCS Ag)
- (2) 92200A246 (10-24 x 7/8 SHCS)

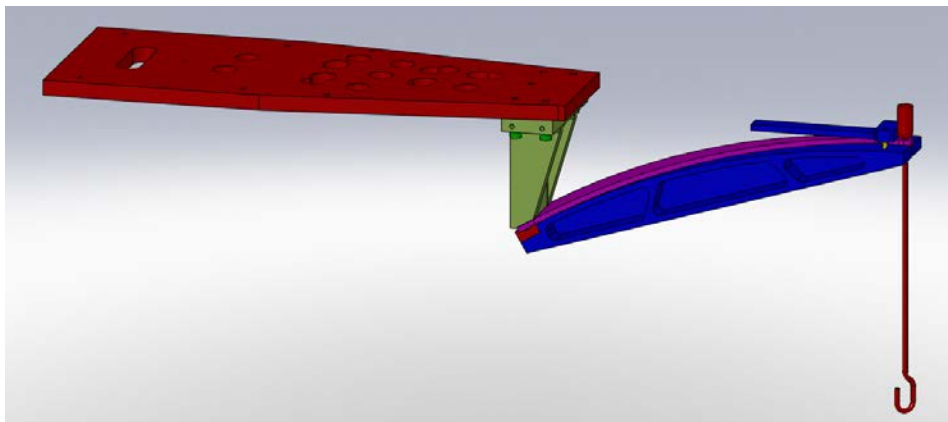
### Tools:

- 1/4" Hex L-Key tool (5/16-18 SHCS)
- 3/8" Wrench (#10 Hex Nut)
- 3/16" Hex L-Key tool (1/4-20 SHCS)
- 5/32" Hex L-Key tool (10-24 SHCS)

**SAFETY GLASSES MUST BE WORN DURING THE FOLLOWING ASSEMBLY STEPS**

1. Secure D1001138 - INTERFACE MOUNTING PLATE to table with (4) D1001700 - SLC INTERFACE MOUNTING CLAMP spread to distribute weight. Placement of clamps should allow for placement of mounting bracket in next step.
  - a. Install hardware 4 places
    - i. C-2032-NA (1/4-20 x 2 SHCS Ag)
    - ii. 98019A355 (1/4 FLAT WASHER)
2. Attach D1002609 - SLC BLADE MOUNTING BRACKET in a backwards position to top of D1001138 - SLC ACB INTERFACE MOUNTING PLATE using D1101290 to guide placement of bracket to measure 1/2" from edge of MOUNTING PLATE.
  - a. Install hardware 4 places
    - i. C-1820-N (5/16-18 x 1 1/4 SHCS)
    - ii. 98019A385 (5/16 FLAT WASHER)
3. Attach D1002844 - SLC ACB BLADE CLAMP and D1002608 - SLC ACB SUSPENSION BLADE to BLADE MOUNTING BRACKET. Blade clamp lip should line up with suspension blade.
  - a. Install hardware 3 places
    - i. C-1820-NA (5/16-18 x SHCS)
    - ii. 98019A385 (5/16 FLAT WASHER)

Note: Guide washers out of clearance for 1/4" holes.
4. Attach D1101099 - aLIGO ACB BEND FIXTURE to D1002844 – SLC ACB BLADE CLAMP. Clearance holes in BEND FIXTURE fit over 3 socket head cap screws attaching BLADE CLAMP, SUSPENSION BLADE to BLADE MOUNTING BRACKET.
  - a. Install hardware 4 places
    - i. C-2008-NA (1/4-20 x 1/2 SHCS Ag)
5. Turnover INTERFACE MOUNTING PLATE and place on table with bracket clearing edge of table, see Figure 21.



**Figure 22: Spring Blade Loading**



6. Secure D1001138 - INTERFACE MOUNTING PLATE with (4) D1001700 - SLC INTERFACE MOUNTING CLAMP spread to distribute weight. to table so that it can sustain 180 lbs. suspended from bracket.
7. Attach D1101298 - BLADE SPRING BENDING HOOK ASSEMBLY to tip of D1002608 - SLC ACB SUSPENSION BLADE.
8. Attach approx. 160lbs of weights onto hook end of D1101298 - BLADE SPRING BENDING HOOK ASSEMBLY bending SUSPENSION BLADE to align with curve on BEND FIXTURE. Weight opening placement should be staggered.
9. Record weight applied to bend blade - \_\_\_\_\_ lbs/grams/kg
10. Attach D1101184 - aLIGO ACB BEND FIXTURE PLATE to D1101099 - ARM CAVITY BAFFLE BEND FIXTURE with D1002608 - SLC ACB SUSPENSION BLADE sandwiched between both parts. This should be done when spring is fully bent.
  - a. Install hardware in 2 places
    - i. 92200A246 (10-24 x 7/8 SHCS)

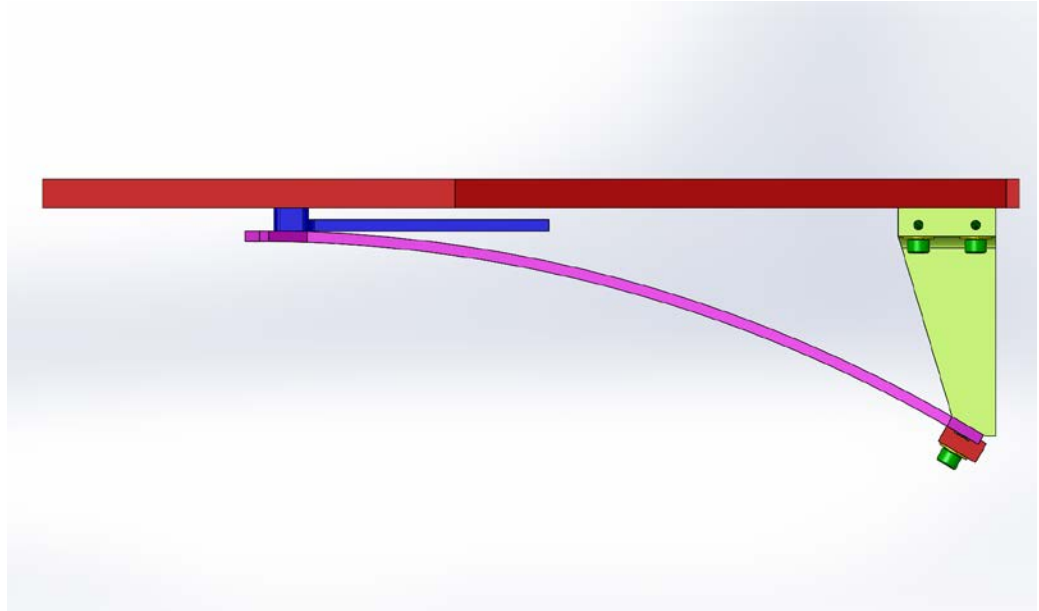
**Note: SUSPENSION BLADE should be securely attached to BEND FIXTURE before continuing to next step.**

11. Slowly remove weights and D1101298 - BLADE SPRING BENDING HOOK ASSEMBLY.
12. Carefully release D1001138 - SLC ACB INTERFACE MOUNTING PLATE from table.
13. Flip assembly over and place securely on table.
14. Temporarily attach (1) D1001700 – SLC INTERFACE MOUNTING CLAMP to D1001138 - SLC ACB INTERFACE MOUNTING PLATE - closer to the BLADE MOUNTING BRACKET to ensure clearance for removal. This will secure MOUNTING PLATE to table during assembly.
15. Carefully detach the assembled D1002609 - SLC BLADE MOUNTING BRACKET from the D1001138 - SLC ACB INTERFACE MOUNTING PLATE, rotate 180° and re-attach to table.
  - a. Removing and installing hardware in 4 places
    - i. C-1820-N (5/16-18 x 1 ¼ SHCS)
    - ii. 98019A385 (5/16 FLAT WASHER)

Note: Do not install a screw to the center hole of BLADE MOUNTING BRACKET.

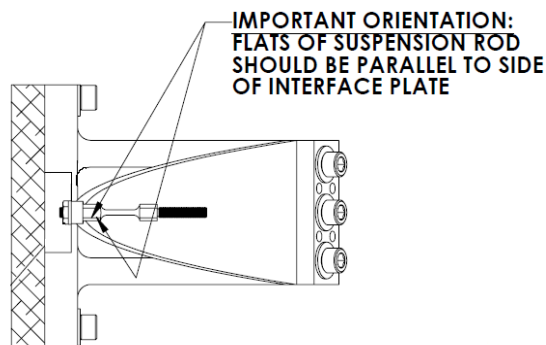
16. Remove D1101099 - aLIGO ACB BEND FIXTURE from D1002844 – SLC ACB BLADE CLAMP.

- a. Remove hardware installed in 6 places.
  - i. (4) C-2008-NA (1/4-20 x 1/2 SHCS Ag)
  - ii. (2) 92200A246 (10-24 x 7/8 SHCS)



**Figure 23: Blade Mounting Bracket position**

17. Attach D1200781 - SLC ACB SUSPENSION ROD to tip of SUSPENSION BLADE. Short threaded end into blade tip. Orient the flat of rod so that a wrench can hold the flat from the blade tip direction, see Figure 23.



**Figure 24: Suspension Rod**

**Note: Suspension Rod orientation is important. Make sure Suspension Rod is lined up with the center hole of the Interface Mounting Plate.**

**E. ACB SUSPENSION ASSEMBLY for BSC4, BSC5, BSC9 & BSC10 -**

Record assembly serial number - Same as D1002564

LIGO Parts and Assemblies:

- (1) D1002582 - SLC BAFFLE TUBE UP ASSEMBLY SN: \_\_\_\_\_
- (1) D1001005-1 - ARM CAVITY BAFFLE BLADE ASSEMBLY SN: \_\_\_\_\_
- (1) D1002564 - EDDY CURRENT DAMPING 8 DIA TUBE ASSY SN: \_\_\_\_\_
- (2) D1201361 - EARTHQUAKE STOP SLEEVE SN: \_\_\_\_\_
- (2) D1201235 - LOCKED THREADED STUD SN: \_\_\_\_\_
- (2) D1001120 - SLC EARTHQUAKE STOP RING SN: \_\_\_\_\_
- (1) D1001007 - ACB TUBE LO ASSEMBLY SN: \_\_\_\_\_
- (1) D1300531 - ACB UPPER MOUNTING HINGE SN: \_\_\_\_\_
- (4) D1300526 - UPPER HINGE CAPTIVE SCREWS SN: \_\_\_\_\_
- (1) D1001186 - 3/4-10 x 4 HEX HEAD SCREW, MODIFIED SN: \_\_\_\_\_
- (2) D1102316 - 3/4-10 x 3/8 NI-CU HEX NUT, MODIFIED SN: \_\_\_\_\_
- (1) D1101285 - TRANSPORT, LOCKING BRACKET SN: \_\_\_\_\_

LIGO Assemblies:

- (1) D1201228 - ANTI-ROTATION ASSEMBLY SN - Same as D1201198
- (1) D1201199 - ANTI-ROTATION CLAMP SN: \_\_\_\_\_
- (1) D1201198 - ANTI-ROTATION BLOCK SN: \_\_\_\_\_
- (6) 1185-5EN938 (HELICOIL, 5/16-18 X 0.938 LONG)
- (4) 1185-4EN250 (HELI-COIL INSERT, 1/4-20 X 1/4 LG)
- (6) C-1832-N (5/16-18 x 2 SHCS)
- (6) WF-31 (5/16 FLAT WASHER)

Hardware:

- (1) N-1024-A (10-24 HEX NUTS Ag)
- (5) 98019A330 (#10 FLAT WASHER)
- (4) C-2016-NA (1/4-20 x 1 SHCS Ag)
- (12) 98019A355 (1/4 FLAT WASHER)
- (2) 98017A200 (3/8 FLAT WASHER)
- (4) 92200A242 (10-24 x 1/2 SHCS)
- (8) C-2016-N (1/4-20 x 1 SHCS)
- (3) 98017A220 (3/4 FLAT WASHER)
- (4) 98019A509 (FLAT WASHER .50 Sz)
- (2) 91845A031 (3/8-16 HEX NUT)
- (6) WF-25 (1/4 FLAT WASHER)
- (6) C-2012-N (1/4-20 x .75 SHCS)
- (6) 1185-4EN250 (HELI-COIL INSERT, 1/4-20 X 1/4 LG)
- (2) V1156 2-116 (2-116 FKM VITON O-RINGS 75D BLACK PARKER V747-75)

Tooling/Fixtures:

- (1) D1101288 - ALIGNMENT FIXTURE, TUBE UP ASSEMBLY
- (1) D1102323 - VARIABLE HEIGHT BRACKET, FLAT
- (1) D1201250 – SUSPENSION ROD GAUGE
- (1) D1201014 – MAGNET SPACING TOOL

Tooling/Fixture Hardware:

- (4) C-2016-NA (1/4-20 x 1 SHCS Ag)
- (19) 98019A355 (1/4 FLAT WASHERS)
- (13) 92200A540 (1/4-20 x 3/4 SHCS)
- (1) N-2520-A (1/4-20 HEX NUT Ag)

Tools:

- 1/4” Hex L-Key tool (5/16-18 SHCS)
- 1/8” Hex L-Key tool (10-24 FHCS)
- 3/8” Wrench (#10 Hex Nut)
- 3/16” Hex L-Key tool (1/4-20 SHCS)
- 5/32” Hex L-Key tool (10-24 SHCS)
- 9/16” Wrench (3/8-16 Stud/Nut)
- 1-1/8” Wrench (3/4-10 Nut)
- (2) 1 1/8” Hex L-Key tool (10-32 SHCS)

- 1. Install Heli-Coil inserts into D1201198 – ANTI-ROTATION BLOCK.**
  - a. Install hardware in 10 places.
    - i. (4) 1185-4EN250 (HELI-COIL INSERT, 1/4-20 X 1/4 LG)
    - ii. (6) 1185-5EN938 (HELICOIL, 5/16-18 X 0.938 LONG)
- 2. Install Heli-Coil inserts into D1300531 - ARM CAVITY BAFFLE UPPER MOUNTING HINGE.**
  - a. Install hardware in 6 places.
    - i. (6) 1185-4EN250 (HELI-COIL INSERT, 1/4-20 X 1/4 LG)
- 3. Add V1156 2-116 - O-Rings to D1000909 – SLC COPPER PLATE securely, 2 places.**

**THE FOLLOWING ASSEMBLY PROCEDURE IS PERFORMED UPSIDE DOWN WITH THE INTERFACE MOUNTING PLATE ON A TABLE**

- 4. Attach hardware to D1200781 - SLC ACB SUSPENSION ROD. Located on D1001005-1 - ARM CAVITY BAFFLE BLADE ASSEMBLY.**
  - a. Install hardware in 1 place
    - i. N-1024-A (10-24 HEX NUT)
    - ii. 98019A330 (#10 FLAT WASHER)

5. Using the D1201250 – SUSPENSION ROD GAUGE, install hardware on long tread of rod. Once measurement is taken loosen nut 1 ½ turns before placing tube. Be very careful not to bend the suspension rod.

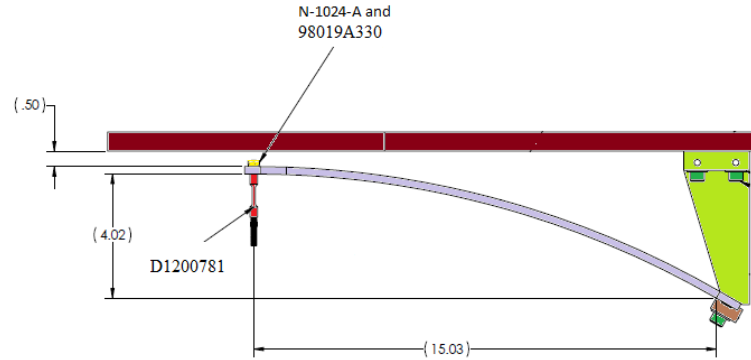
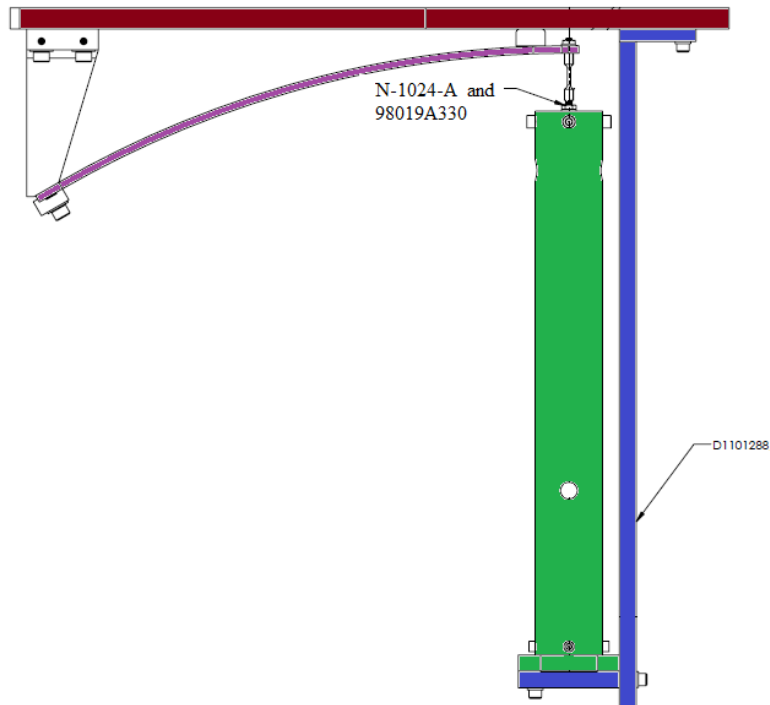


Figure 25: Suspension Rod Hardware

6. Temporarily place D1002564 - SLC EDDY CURRENT DAMPING 8 DIAMETER TUBE ASSEMBLY to align earthquake holes to D1002582 - SLC BAFFLE TUBE UP ASSEMBLY. Once aligned remove D1002564 - SLC EDDY CURRENT DAMPING 8 DIAMETER TUBE ASSEMBLY.
7. Attach D1002582 - SLC BAFFLE TUBE UP ASSEMBLY to D1200781 - SLC ACB SUSPENSION ROD located on D1001005-1 – ARM CAVITY BAFFLE BLADE ASSEMBLY. Screw the TUBE UP ASSEMBLY into the rod until it touches the D1201250 – SUSPENSION ROD GAUGE.
8. Attach D1101288 - ALIGNMENT FIXTURE, TUBE UP ASSEMBLY to D1001138 - SLC ACB INTERFACE MOUNTING PLATE on D1001005-1 – ARM CAVITY BAFFLE BLADE ASSEMBLY. Bottom slotted part must be loose to slide to the interface plate.
- a. Install hardware in 2 places
    - i. C-2016-NA (1/4-20 x 1 SHCS Ag)
    - ii. 98019A355 (¼ FLAT WASHER)
9. Align and level D1002582 - SLC BAFFLE TUBE UP ASSEMBLY. Have measuring fixture in place while twisting TUBE UP.
10. Attach D1101288 - ALIGNMENT FIXTURE, TUBE UP ASSEMBLY to the bottom of D1002582 - SLC BAFFLE TUBE UP ASSEMBLY.
- a. Install hardware in 2 places
    - i. C-2016-N (1/4-20 x 1 SHCS)
    - ii. 98019A355 (¼ FLAT WASHER)

- 11. Recheck measurement by holding suspension rod in place with wrench. With an addition wrench tighten the nut at correct measurement. Be sure not to let rod twist.**



**Figure 26: Suspension Rod and Tube Up Assembly**

- 12. Remove D1101288 - ALIGNMENT FIXTURE, TUBE UP ASSEMBLY.**
- a. Remove hardware in 4 places
    - i. C-2016-NA (1/4-20 x 1 SHCS Ag)
    - ii. 98019A355 (1/4 FLAT WASHER)
- 13. Place D1002564 - SLC EDDY CURRENT DAMPING 8 DIAMETER TUBE ASSEMBLY on D1001005-1 – ARM CAVITY BAFFLE BLADE ASSEMBLY. With one person holding base of UP TUBE ASSEMBLY, then reaching inside of 8” TUBE and grabbing loose end of UP TUBE ASSEMBLY.**
- 14. Insert (2) D1201235 – LOCKED THREADED STUD through D1002564 - SLC EDDY CURRENT DAMPING 8 DIAMETER TUBE ASSEMBLY and D1002582 - SLC BAFFLE TUBE UP ASSEMBLY. Mate STUD to (2) D1201361 - EARTHQUAKE STOP SLEEVE. TUBE UP ASSEMBLY needs to be held while threaded studs are getting placed.**
- a. Install hardware in 2 places (stud, .5 washer, tube, .5 washer, sleeve, 3/8 washer, nut).
    - i. 98017A200 (3/8 FLAT WASHER)
    - ii. 98019A509 (FLAT WASHER .50 Sz)
    - iii. 91845A031 (3/8-16 HEX NUT)

- 15. Attach D1002564 - SLC EDDY CURRENT DAMPING 8 DIAMETER TUBE ASSEMBLY to D1001005-1 – ARM CAVITY BAFFLE BLADE ASSEMBLY. Measurement from end of mounting plate to base of 8” TUBE should be ½”. TUBE UP ASSEMBLY still being held in place until EQ RING in Step 10 is in place.**
  - a. Install hardware in 4 places
    - i. C-2016-NA (1/4-20 x 1 SHCS Ag)
    - ii. 98019A355 (¼ FLAT WASHER)
  
- 16. Attach (2) D1001120 - SLC EARTHQUAKE STOP RING to D1002564 - SLC EDDY CURRENT DAMPING 8 DIAMETER TUBE ASSEMBLY.**
  - a. Install hardware in 4 places
    - i. 92200A242 (10-24 x ½ SHCS)
    - ii. 98019A330 (#10 FLAT WASHER)
  
- 17. Attach D1001007 - ACB TUBE LO ASSEMBLY to D1002582 - SLC BAFFLE TUBE UP ASSEMBLY. Loosely, do not tighten.**
  - a. Install hardware in 4 places
    - i. C-2016-N (1/4-20 x 1 SHCS)
    - ii. 98019A355 (¼ FLAT WASHER)
  
- 18. Adjust distance between the magnets and COPPER PLATE to be 0.090” using D1201014 – MAGNET SPACING TOOL. Tighten screws from Section II.C.4.**
  
- 19. Attach D1101285 - TRANSPORT, LOCKING, ACB to D1002564 - SLC EDDY CURRENT DAMPING 8 DIAMETER TUBE ASSEMBLY and D1001007 - ACB TUBE LO ASSEMBLY. Place on side next to BLADE base. Align flush to 8” TUBE edge and tighten.**
  - a. Install hardware in 4 places
    - i. C-2016-N (1/4-20 x 1 SHCS)
    - ii. 98019A355 (¼ FLAT WASHER)
  
- 20. Tighten TUBE LO ASSEMBLY to TUBE UP ASSEMBLY and loosen D1101285 - TRANSPORT, LOCKING, ACB.**
  
- 21. Assemble D1300531 - ARM CAVITY BAFFLE UPPER MOUNTING HINGE to D1001186 (SCREW HEX HD 3/4-10 x 4, MODIFIED)**
  - a. Install hardware listed (screw, washer, hinge, washer, nut, nut, washer, tube)
    - i. (2) D1102316 (3/4-10 x 3/8 HEX NUT NI-CU, MODIFIED)
    - ii. (3) 98017A220 (¾ FLAT WASHER)
  
- 22. Attach D1201198 – ANTI-ROTATION BLOCK to D1300531 - ARM CAVITY BAFFLE UPPER MOUNTING HINGE.**
  - a. Install hardware in 6 places
    - i. C-2012-N (1/4-20 x ¾ SHCS)
    - ii. WF-25 (1/4 FLAT WASHER)

- 23. Insert D1001186 (SCREW HEX HD 3/4-10 x 4, MODIFIED) into D1001007 - ACB TUBE LO ASSEMBLY. Screw in approximately 1.5 inches. Final rest should have the hinge of the D1300531 - ARM CAVITY BAFFLE UPPER MOUNTING HINGE positioned on the same side as the D1000909 – SLC COPPER PLATE.**
- 24. Attach D1102323 VARIABLE HEIGHT BRACKET, FLAT to 8” TUBE. Place on side opposite to BLADE base. Edge of BRACKET should be flush with 8” TUBE base. Tighten to 8” TUBE base.**
  - a. Install hardware in 2 places.
    - i. 92200A540 (1/4-20 x 3/4 SHCS)
    - ii. 98019A355 (¼ FLAT WASHER)
- 25. Adjust distance between D1300531 - ARM CAVITY BAFFLE UPPER MOUNTING HINGE and D1001007 - ACB TUBE LO ASSEMBLY by Bolt and Nuts. The scribe line on D1201198 – ANTI-ROTATION BLOCK must line up with the scribe line on D1102323 VARIABLE HEIGHT BRACKET, FLAT.**
- 26. Attach D1102323 VARIABLE HEIGHT BRACKET, FLAT to D1300531 - ARM CAVITY BAFFLE UPPER MOUNTING HINGE and D1201198 – ANTI-ROTATION BLOCK.**
  - a. Install hardware in 4 places
    - i. 92200A540 (¼-20 x ¾ SHCS)
    - ii. 98019A355 (¼ FLAT WASHER)
- 27. Tighten D1001186 - SCREW HEX HD 3/4-10 x 4, MODIFIED against D1300531 - ARM CAVITY BAFFLE UPPER MOUNTING HINGE and D1001007 - ACB TUBE LO ASSEMBLY.**
- 28. Attach D1201199 – ANTI-ROTATION CLAMP to the D1201198 – ANTI-ROTATION BLOCK.**
  - a. Install hardware in 6 places
    - i. C-1832-N (5/16-18 x 2 SHCS)
    - ii. WF-31 (5/16 FLAT WASHER)
- 29. Set spacing between MAGNETS and COPPER PLATE to approximately 0.090 using D1201014 – MAGNET SPACING TOOL. Tighten the COPPER PLATE to the 8” TUBE.**
- 30. Insert (4) D1300526 - ACB MOUNTING HINGE CAPTIVE SCREWS to D1300531 - ARM CAVITY BAFFLE UPPER MOUNTING HINGE**
- 31. Torque all screws, as required.**
- 32. Weigh assembly and record: \_\_\_\_\_ lbs. (kg/grams)**